

## A review of the *Erebia ligea*-complex (Lepidoptera, Satyridae) from Eastern Asia

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**Abstract** It is shown that East Asia is inhabited by two similar species of the *Erebia (ligea* Linnaeus, 1758) group, well differing in the male genitalia structure as well as a number of the wing pattern details. They are *E. ligea* Linnaeus, 1758 and the second sympatric species, which has a priority name *Erebia ajanensis* Ménétrière, 1875, stat. nov., nec Effinger, 1907, nec Warren, 1936, nec Kurentzov, 1950, 1970, and on a preliminary review seems to be represented by three subspecies: the nominotypical, known from a type series from Ayan (the coast of the Sea of Okhotsk in the Khabarovskii Krai Province, Russia), ssp. *kosterini* P. Gorbunov, Korshunov et Dubatolov, 1995 (= *Erebia kosterini*) in the southern Magadan Province, Russia, and ssp. *arsenjevi* Kurentzov, 1950 (= *Erebia ligea arsenjevi*) in more southerly regions of the Russian Far East, Korea, N and NE? China. The lectotypes of *E. ajanensis*, *E. ligea arsenjevi* (that is *E. ajanensis arsenjevi*) and of *E. ligea koreana* Matsumura, 1928 have been designated, as well as that of *E. eumonia* Ménétrière, 1859. The latter taxon was described on a heterogeneous series including both species, *E. ligea* and *E. ajanensis*. After lectotype designation the name *eumonia* became the valid one for an eastern subspecies of *E. ligea*, ranging from the Altai Mts (except for the north part) to the Magadan Province of Russia and Korea. All the subspecies of the true *E. ligea* described from this vast territory, except for *E. ligea sachalinensis* Matsumura, 1919, *E. ligea rishirizana* Matsumura, 1928 and *E. ligea takanonis* Matsumura, 1909, are considered as synonyms of *E. ligea eumonia*.

**Key words** Review, synonymy, Satyridae, *Erebia*, *Erebia ligea*, lectotype, distribution, East Asia, Siberia, Far East.

In 1994, while working on the book by Korshunov and Gorbunov (1995) on the butterflies of the Asian part of Russia, P. Gorbunov discovered that specimens collected by O. E. Kosterin in the Magadan region, earlier identified as “*Erebia ligea*”, differ substantially from this species in the male genitalia structure. After discussing the systematic position of these specimens the authors decided that they comprise a new species, and later described it as *Erebia kosterini* P. Gorbunov, Korshunov et Dubatolov (Korshunov and Gorbunov, 1995). They differ from the common *E. ligea* by stick-like valvae, without a ledge, and with a sharp decrease in their thickness.

Later similar butterflies were collected by V. Baglikov in the southern Sikhote-Alin' Mountains (Primorye territory, or the Primorskii Krai Province of Russia). Taking into

account these new materials, it became necessary to study thoroughly the systematics of all East Asian taxa in the *E. ligea* group.

We have studied collections in the Siberian Zoological Museum (SZMN) of the Institute of Animal Systematics and Ecology, the Siberian Division of the Russian Academy of Sciences (Novosibirsk), the Institute of Plant and Animal Ecology, Uralian Division of the Russian Academy of Sciences (Ekaterinburg), and the Zoological Institute (ZIN) of the Russian Academy of Sciences (St-Petersburg), including the type materials. Thanks to the courtesy of Mr Hiroshi Yoshimoto we were provided with a photograph of the type specimen of *Erebia ligea koreana* Matsumura, preserved at the Hokkaido University (Sapporo).

The first taxon of this group from East Asia was *Erebia ligea ajanensis*, described by Ménéttriès (1857) on the material collected by I. Vosnesensky from Ayan (recently—the northern Khabarovskii Krai Province, Russia). Later, after receiving of further materials, he redescribed it but as an independent species under the name *E. eumonia* Ménéttriès, 1859. This description was based on collections of L. Schrenck from the Hadshi Bay “de la bai d’ Hadshi, sur les côtes de la Mandshourie, par le 49° de latitude” (now Sovetskaya Gavan’, Russia) and mentioned *Erebia ligea ajanensis* only as a synonym. In another work (Ménéttriès, 1859b) he again gave *Erebia eumonia* with a synonym *E. ligea ajanensis* and enumerated all the available materials from Ayan, the Hadshi Bay, and one more specimen from Nikolaevsk. The same work contains a picture of *E. eumonia* showing undoubtedly an eastern type of *E. ligea*.

We have studied the type specimens of both taxa described by E. Ménéttriès, *Erebia ligea ajanensis* and *E. eumonia*, preserved in the collection of ZIN. The type series of *Erebia ligea ajanensis* is represented by two females. These females are characterised by all the characters of the species described by us as *Erebia kosterini* (see below), so : *Erebia ajanensis* Ménéttriès, 1857, **stat. nov.** = *Erebia kosterini* P. Gorbunov, Korshunov et Dubatolov, 1995, **syn. nov.**

The type series of *E. eumonia*, according to the original description, consisted of “17 individuals”. It turned to be heterogeneous as being represented now only by two males of *E. ligea* and one female of *E. ajanensis* available in the ZIN collection. The sex of the specimen depicted in Ménéttriès (1859b) was not specified there and can hardly be undoubtedly inferred from the picture as such (the habitus of the wing pattern resembles a male, while a well developed inner white band on the hind wing underside rather suggests a female). Neither of the three specimens existing at present corresponds to the picture in individual details of the pattern. Since the Ménéttriès’ picture shows undoubtedly an *E. ligea* specimen, we have chosen a male specimen of *E. ligea* as a lectotype, so giving the name “*eumonia*” priority for the eastern subspecies of this species, earlier known as *E. ligea ajanensis*, *auct. nec* Ménéttriès, 1857 (Kurentzov, 1950, 1970 ; Tuzov, 1993 ; Korshunov and Gorbunov, 1995). The paralectotype of *E. eumonia* referring to *E. ajanensis*, belongs to a subspecies which received the name in 1950 after the description of *Erebia ligea arsenjevi* Kurentzov, 1950.

The diagnostic characters of the similar species *Erebia ajanensis* and *Erebia ligea* are summarised in the following table (see also Fig. 17).

Character	<i>Erebia ligea</i>	<i>Erebia ajanensis</i>
1. internal margin of the fulvous band on the fore wing	straight or almost straight	with an angular incision

2. male androconial scales	prevail on an entire surface of a dark sex-brand, well visible against the light	found only at the vein A on the fore wing, with a sex-brand vague, weakly visible against the light
3. the number of ocelli on the fore wing	2-5	4-6
4. an imaginary straight line drawn through the centres of ocelli between the veins $M_1$ - $M_2$ and $M_2$ - $M_3$ of the fore wing	crossing the ocellus between the veins $Cu_1$ - $Cu_2$ and the wing margin at the anal angle	crossing the ocellus between the veins $M_3$ - $Cu_1$ and the outer wing margin
5. the ocellus between the veins $Cu_1$ - $Cu_2$ on the fore wing	not larger than that between the veins $M_2$ - $M_3$	larger than that between the veins $M_2$ - $M_3$
6. the ocellus between the veins $R_5$ - $M_1$	absent	present in more than half of specimens
7. an angle formed by the row of ocelli on the hind wing, with the apex at the ocellus between the veins $M_3$ - $Cu_1$	very blunt, more than $140^\circ$	much less blunt, about $110$ - $130^\circ$
8. the ocellus between the veins $M_3$ - $Cu_1$ on the hind wing	always much less than the two adjacent ones	equal to or slightly less than the two adjacent ones
9. the ocellus between the veins $M_2$ - $M_3$ on the hind wing	absent in more than half of specimens	always present
10. the valva in the male genitalia	thick but narrowing drastically, with a ledge, in the last quarter of the length	thin, tapering smoothly to the apex
11. the dorsal margin of the valva	dentate on more than a half of its length	dentate on less than a half of its length

In general, by the male genitalia structure *E. ajanensis* (Figs 18-19, 25-32) somewhat resembles a North American species *Erebia vidleri* Elwes, 1898 (Fig. 24) belonging to a special species group (Warren, 1936; Kogure and Iwamoto, 1992). Apart from good differences between these species by the wing pattern, others can also be found in the male genitalia as follows.

Character	<i>E. ajanensis</i>	<i>E. vidleri</i>
1. the shape of the valva	the distal half is about evenly thin, proximally the valva steadily becomes thicker	the distal one-third is thin, proximally the valva steadily becomes thicker
2. ratio of the thickness of the valva at the base, at the middle, and at the apex	2 : 1 : 1	4 : 2 : 1
3. the teeth on the distal half of the valva	large, of uneven sizes	small, of an even size
4. a narrowing of the valva proximally of the most proximal tooth	small but present	absent

5. the valva and tegumen+ forming an acute angle about parallel  
uncus

Below a preliminary review is given for both two species including subspecies level taxa which inhabit Asia east of 120°E.

***Erebia ajanensis* Ménéttriès, 1857, stat. nov.**

Range (Fig. 16). Russia: the southern Magadan region and the northern Khabarovskii Krai Province: mostly along the coast of the Sea of Okhotsk, and Bureinskie Gory [Bureinskie Mountains]; the Sikhote-Alin' Mountains within the southern Khabarovskii Krai and Primorskii Krai Provinces. North Korea. North and, probably, North-Eastern China.

***Erebia ajanensis ajanensis* Ménéttriès, 1857, stat. nov. (Fig. 1)**

*Erebia ligea ajanensis* Ménéttriès, 1857, *Enumeratio Corporum Anim. Mus. imp. Acad. Sci. Petropolitanae* (Lepid.) (2): 104.

Type locality. "Ajan" [now—Ayan, Khabarovskii Krai, Russia].

Type materials. Lectotype. ♀ (Fig. 1), with labels: "Ajan." (handwriting on red paper); "coll. Acad./Petrop." (printed on white paper); "Wosnesensky leg." (handwriting on white paper by V.V. Dubatolov); "Lectotypus *Erebia/ligea* var. *ajanensis*/Mén./design. Dubatolov 1997" (on a red paper); "*Erebia/ajanensis/ajanensis* Mén./V.V. Dubatolov det. VI 1997". Paralectotype: 1 ♀, "657" (printed on a white paper); "k. Ershova." (printed on a white paper; in Russian); "*Ajanensis*/Ménét. Ajan." (handwriting on white paper; label with a double black margin); "Wosnesensky leg." (handwriting on a white paper by V.V. Dubatolov); "Paralectotypus *Erebia/ligea* var. *ajanensis*/Mén./design. Dubatolov 1997" (on a red paper); "*Erebia/ajanensis/ajanensis* Mén./V.V. Dubatolov det. VI 1997". All in ZIN.

Range. Known only on the type series from the environs of Ayan (a coast of the Sea of Okhotsk), the northern Khabarovskii Krai Province, Russia.

A differential diagnosis is based on the two known females only. From females of other subspecies they differ by a small size, the fore wing length being 20–21 mm, and three relatively large ocelli on the fore wing upperside, that between the veins  $M_2$  and  $M_3$  containing a white dot, there is also a black dot between the veins  $M_1$  and  $M_2$ . There are four ocelli with white pupils on the hind wing underside; these ocelli are small, their diameter not exceeding a half of the distance between the veins. The fulvous band on the fore wing upperside is comparatively wide, its narrowing between the veins  $M_3$  and CuA is weak, the ratio of the width of the band at this point to the fore wing length being approximately 0.16 in the two specimens.

***Erebia ajanensis kosterini* P. Gorbunov, Korshunov et Dubatolov, 1995, stat. nov. (Figs 2–3)**

*Erebia kosterini* P. Gorbunov, Korshunov et Dubatolov, 1995, *Butterflies Asian Part Russia*: 123, 188: fig. 253, 190: fig. 253.

*Erebia (ligea)*: Kosterin, 1994, *Actias* 1: 78, nec Linnaeus, 1758.

Type locality. The Khindzha River, Koni Peninsula, Magadan Province, Russia.

Type materials. Holotype. ♂ (Fig. 2), Magadan Province, Koni Peninsula, the low reaches of the Khindzha River, 20. VII. 1989 (O. Kosterin leg.). Paratypes. 2 ♂ 1 ♀, Koni Peninsula, the low reaches of the Khindzha River, 20. VII. 1989 (O. Kosterin leg.) (1 ♀ is *E. ligea eumonia* in truth); 1 ♀ (allotype) (Fig. 3), the same locality, 20. VII. 1989 (O. Kosterin leg.). All in SZMN.

Additional materials. Magadan Province: 9 ♂ 4 ♀, the settlement Palatka, 10–19. VII. 1993, 18–19. VII. 1995, 22. VII. 1996 (V. Baglikov leg.).

Range. The southern Magadan Province, Russia.

A small subspecies, the fore wing length being 10–21 mm in males, 23 mm in females. Both sides of the hind wing have four blind (in males) or white-centred (in females) ocelli of a considerably elongate (oval) shape. The fulvous band on the fore wing upperside is comparatively wide, the narrowing between the veins  $M_3$  and CuA is weak, mainly in males; the ratio of the width of the band at this point to the fore wing length being 0.18–0.20 in males and 0.17–0.18 in females.

Note. Now we only provisionally accept *E. ajanensis kosterini* as a separate subspecies, since in the above mentioned series of 9 males and 4 females, collected by V. Baglikov at the settlement Palatka, the Magadan Region, 5 specimens have perfectly round ocelli on the wing underside while 8 other specimens have elongate ocelli. The size of these butterflies is the same as in the typical *kosterini* and *ajanensis*, the fore wing length being 19.5–23.2 mm in males and 20.0–23.3 mm in females. Additional material from the type locality of *E. ajanensis kosterini* is necessary for a determination of its subspecies status. If specimens with round ocelli are found, then this taxon should be synonymized to the nominotypical subspecies *E. ajanensis ajanensis*. For the moment we suppose the population from Palatka as representing a transitory zone between the subspecies, one of us (P. Gorbunov) thinking that there is too little evidence of subspecies differentiation in *E. ajanensis*.

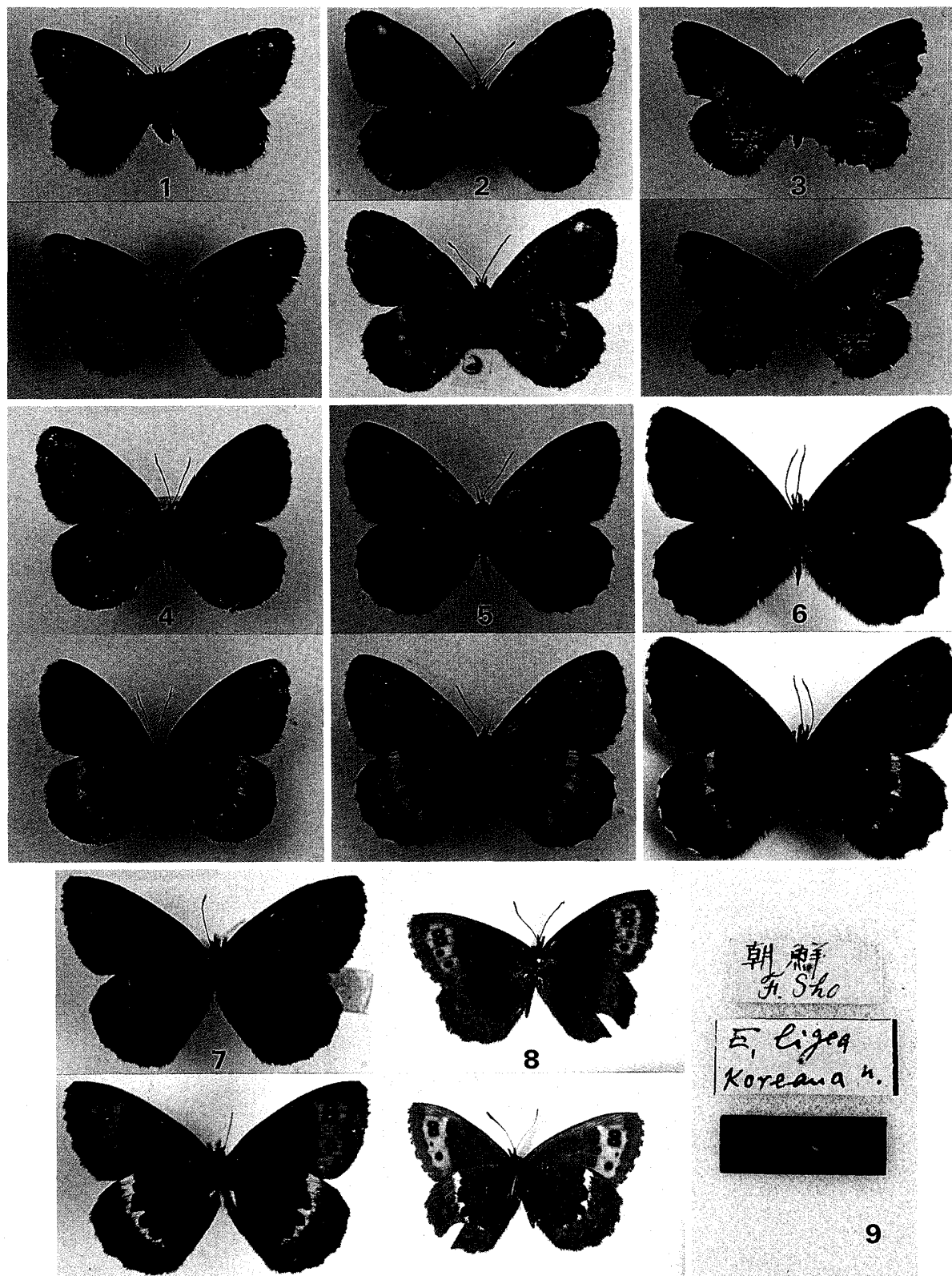
Habitat. On the Koni Peninsula the butterflies were found in the valleys of the Khindzha and Burgauli Rivers, covered with a forest-tundra-like landscape formed by alternating tall bushes of *Dushekia fruticosa* and *Pinus pumila*, heath-like openings with various Ericaceae and *Empetrum* dominating in the herbage, and polydominate herb meadows (Kosterin, 1994).

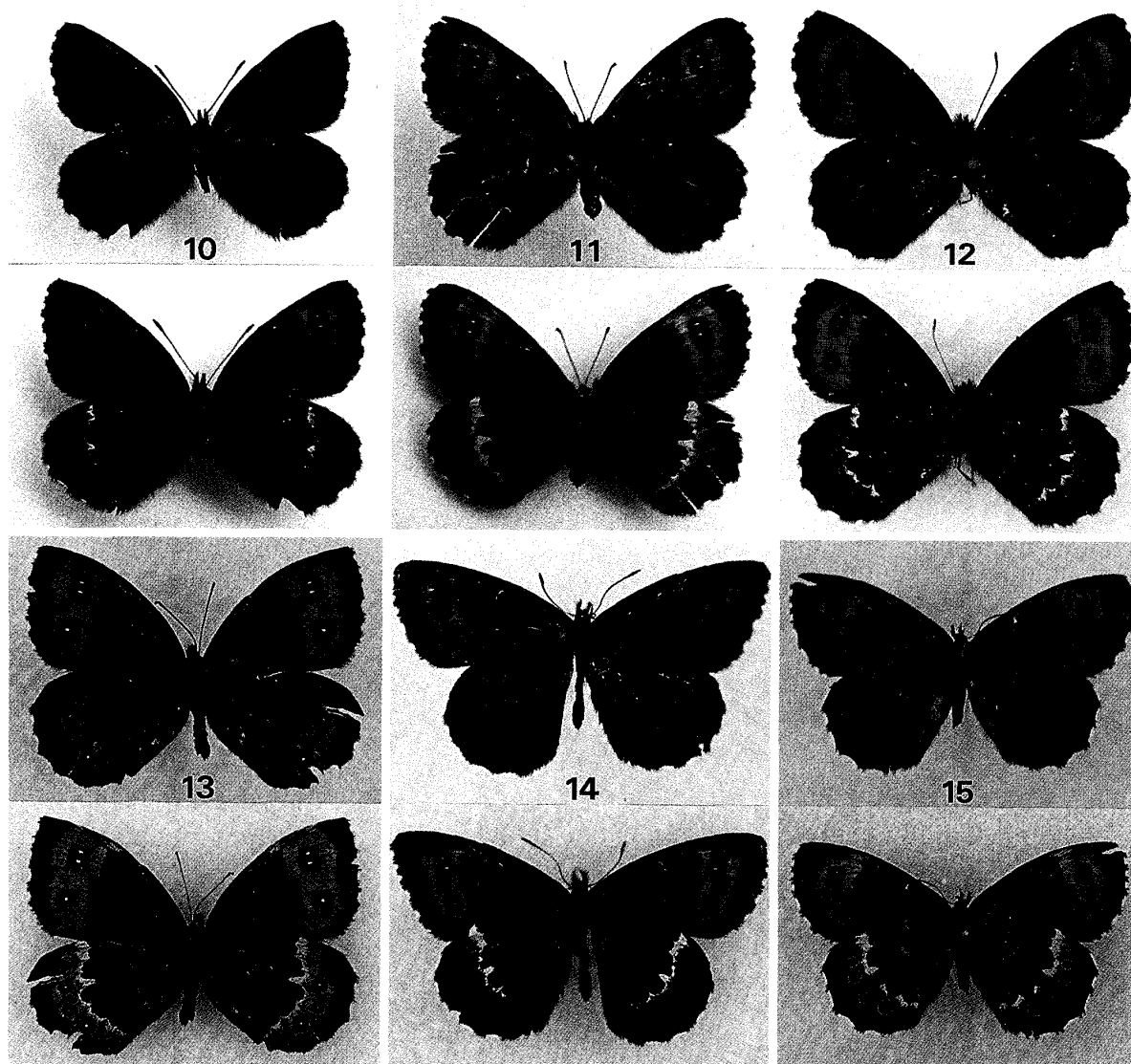
***Erebia ajanensis arsenjevi* Kurentzov, 1950, stat. nov. (Figs 4–6)**

*Erebia ligea arsenjevi* Kurentzov, 1950, *Ent. Obozr.* **31**: 243; Azarova, 1986, *Syst. Ecol. Cheshuekr. Daln. Vost. SSSR*: 123; Kogure and Iwamoto, 1992, *Yadoriga* (150): 17; Tuzov, 1993, *Syn. List Butterflies ex-USSR*: 31; Korshunov and Gorbunov, 1995, *Butterflies Asian Part Russia*: 122.  
*Erebia ligea arsenjevi* [sic]: Kurentzov, 1970, *Butterflies Far East USSR*: 62.

Type locality. “Ist. Kolumbe” (in Russian) [head-water of the Kolumbe River, Nature Reserve “Sikhote-Alinskii”, Krasnoarmeiskii raion [district], Primorskii Krai Province, Russia].

Type materials. A good picture of a type specimen (syntype) of *Erebia ligea arsenjevi* and its labels (“20 VII 34/Ist. Kolumbe”; “Syntypus *Erebia ligea/arsenjevi* Kurentzov, / 1950”) is given in the work of Kogure and Iwamoto (1992: 17, fig. 8). According to this picture, the specimen possesses all the characters of the species *Erebia ajanensis*. Besides, in the first





Figs 1-15. *Erebia ajanensis* and *Erebia ligea*. 1. *E. ajanensis ajanensis* Ménétrières. Lectotype ♀ of *Erebia ligea ajanensis* Ménétrières. 2. *E. ajanensis kosterini* P. Gorbunov, Korshunov et Dubatolov. Holotype ♂ of *Erebia kosterini* P. Gorbunov, Korshunov et Dubatolov. 3. *Ditto*. Paratype (allotype) ♀ of *Erebia kosterini* P. Gorbunov, Korshunov et Dubatolov. 4. *E. ajanensis arsenjevi* Kurentzov. ♂, Primorye, Oblachnaya Mt. 5. *Ditto*. ♀, Primorye, Oblachnaya Mt. 6. *Ditto*. ♂, North Korea, Paekimjun. 7. *E. ligea eumonia* Ménétrières. Lectotype ♂ of *Erebia eumonia* Ménétrières. 8. *Ditto*. Lectotype ♂ of *E. ligea koreana* Matsumura. 9. Labels of lectotype of *E. ligea koreana* Matsumura. 10. *E. ligea rishirizana* Matsumura. ♂, Hokkaido, Mt Nishikumanoshiri. 11. *Ditto*. ♀, Hokkaido, Mt Nishikumanoshiri. 12. *E. ligea takanonis* Matsumura. ♂, Honshu, Mt Yatsugatake. 13. *Ditto*. ♀, Honshu, Mt Yatsugatake. 14. *E. ligea eumonia* Ménétrières. Paralectotype ♂ of *Erebia eumonia* Ménétrières. 15. *E. ajanensis arsenjevi* Kurentzov. Paralectotype ♀ of *Erebia eumonia* Ménétrières.

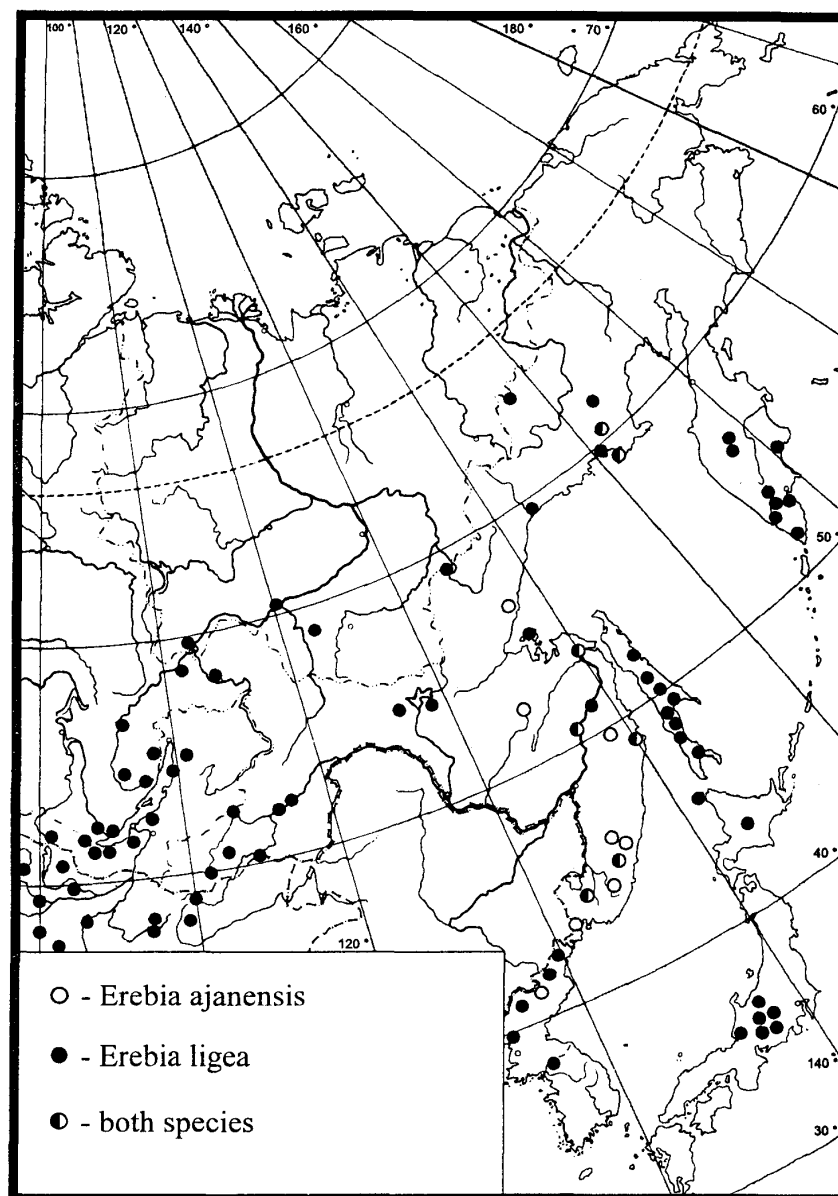


Fig. 16. A distribution map of *Erebia ajanensis* and *Erebia ligea*.

description it was stated that "The valvae in the latter race [a Sakhalin race] are thicker, with a sharp ledge in the proximal part; in a new subspecies they are thin and has no such a ledge". We choose the depicted specimen as the lectotype. It is preserved in the Institute of Biology and Pedology, Far Eastern Division of the Russian Academy of Sciences (Vladivostok).

Additional materials. China: 1 ♀, between Peking (=Beijing) and Lake Dolon-nor. Korea: Ryanggangdo: 1 ♂, Paekimjun sangnone, 8. VII. 1985 (from Im Chong An); 2 ♂, Paekimjun, 11. VII. 1985 (from Im Chong An). Russia: Primorye (Primorskii Krai Province): 7 ♂, Sidemi (or Sidimi in another transliteration; now—Narva, Khasan district), 1897 (Jankowsky leg.); 7 ♀, St. Ilya Mt, Spasskii Uezd [district], 31. VII–1. VIII. 1926 (Djakonov et Filipjev' leg.); 6 ♂, Chuguevskii Raion [district], the headwater of the Sokolovka River, [approximately 20 km SE of Chuguevka], 15–31. VII. 1974 (V. Kuznetsov leg.); 1 ♂ 2 ♀, Mt Oblachnaya, S slope, 26. VII. 1982 (Beljaev leg.); 1 ♂, near the settle-



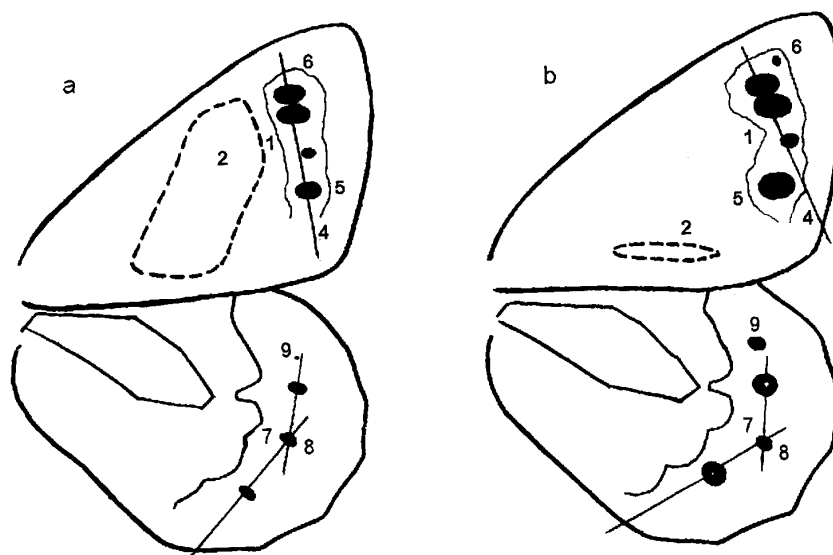


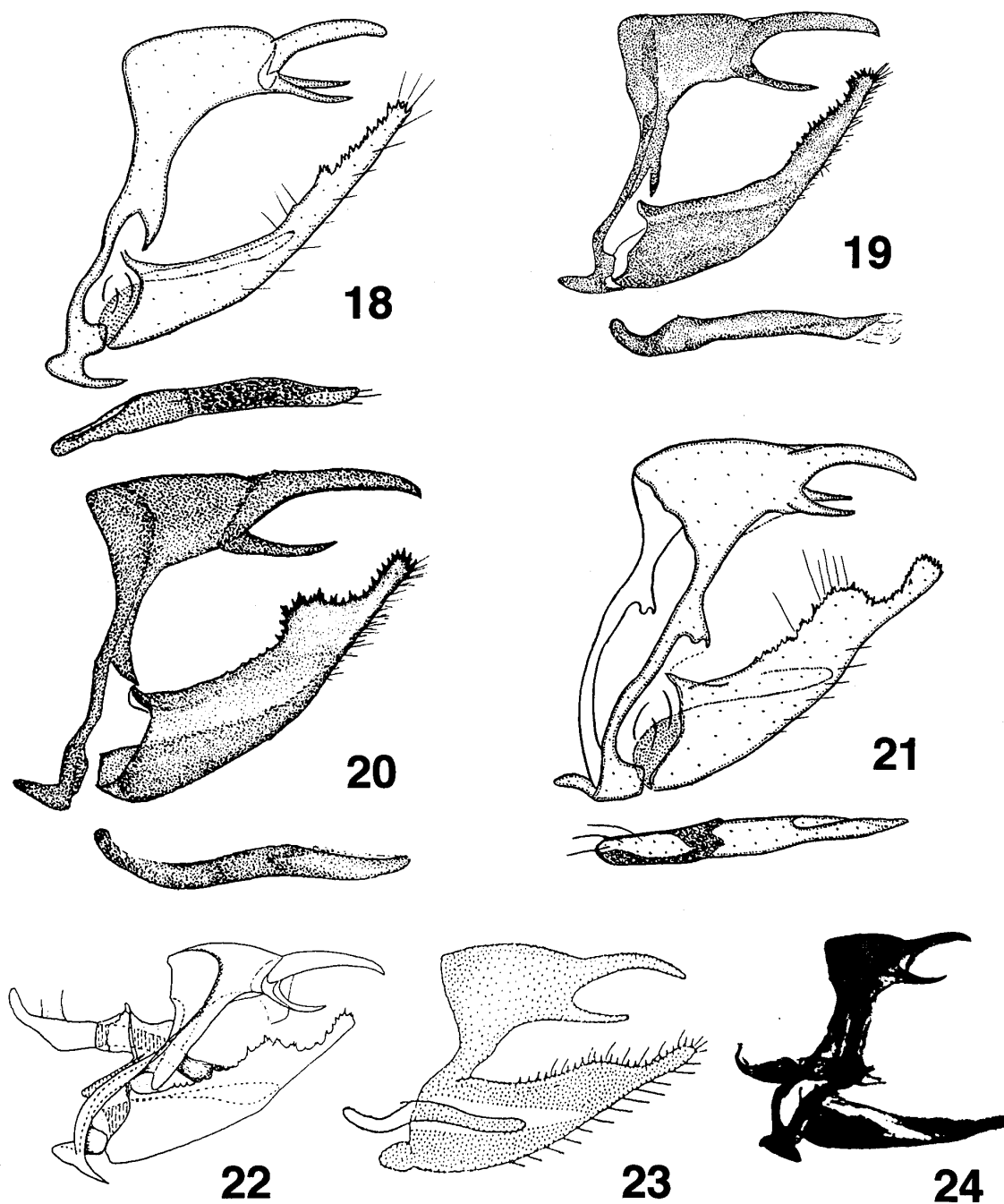
Fig. 17. A scheme of the wing pattern of *Erebia ligea* (a) and *Erebia ajanensis* (b). Numerals correspond to the specific characters in the table.

ment Krasnorechenskii, 13. VII. 1992 (V. Baglikov leg.); 1 ♂, Anuchinskii Raion [district], [30 km N of Chernyshevka], village LZP-3, VI. 1980 (V. Bakurov leg.); 1 ♂, the middle flow of the Iman River (now—the Bolshaya Ussurka River), 20. VII. 1934 (Kurentzov leg.). Khabarovskii Krai Province: 1 ♀, Nikolaevsk-na-Amure, 12. VIII. 1854 (?Schrenck leg.); 1 ♂, Nature Reserve “Komsomol’skii”, the cordon Zolotoi, 11. VII. 1988 (V. Olschwang leg.); 2 ♂, “the Sikhote-Alin’ Mts”, the gold mine Zolotoi, 28. VI. 1982 (E. Novomodnyi leg.); 1 ♀, the railway station Vysokogornaya, 10. VII. 1974 (A. Barkalov leg.); 1 ♀ (the paralectotype of *Erebia eumonia* Mén.) (Fig. 15), Bai Hadschi [Sovetskaya Gavan’] (Schrenck leg.); 2 ♂, Bureinskie Gory [the Bureinskie Mountains], [the headwater of the Verkhnyaya Bureya River], the zimovie [winter house] Medvezhye, 26. VII. 1977 (E. Novomodnyi leg.).

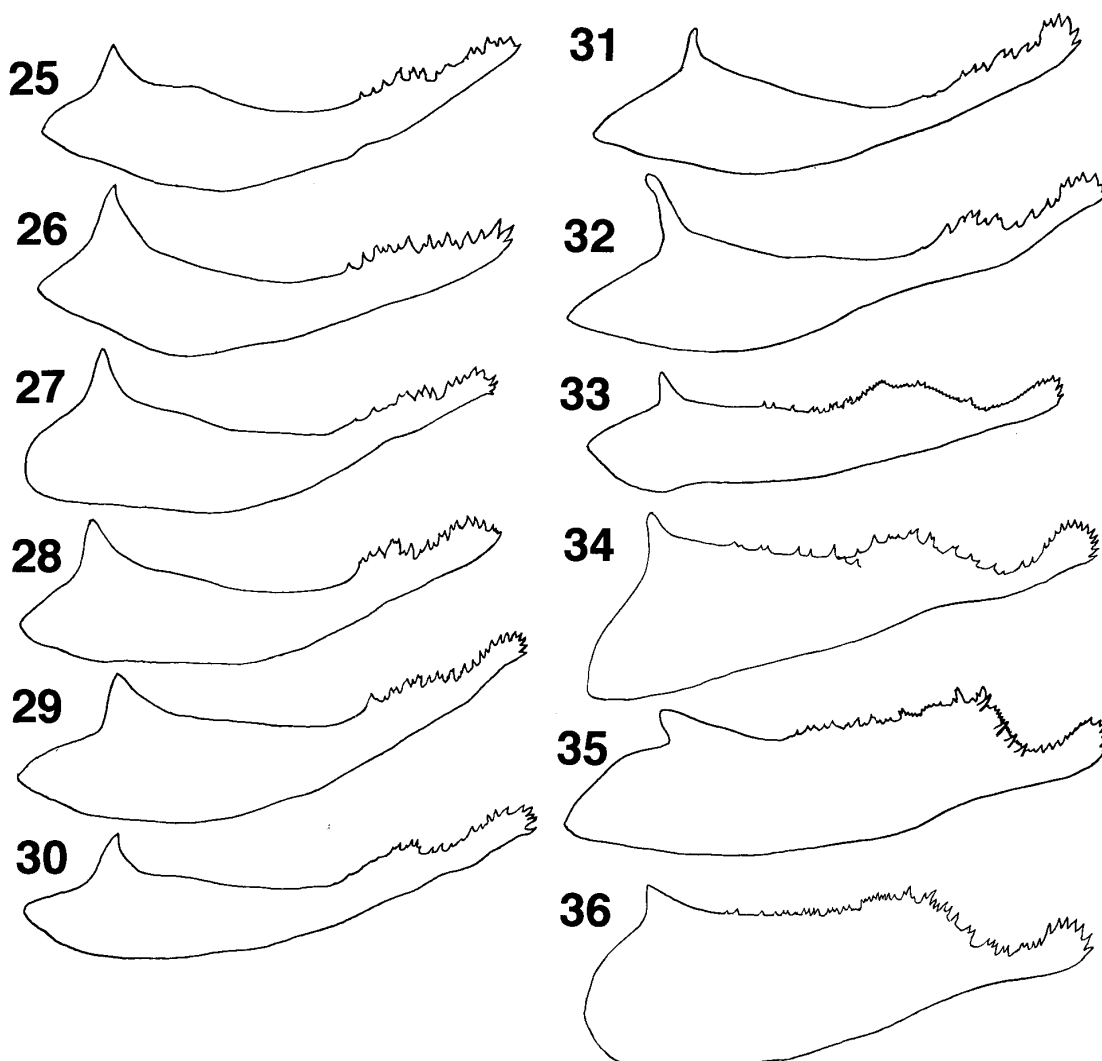
Range. Russia: the southern Khabarovskii Krai Province north to the Bureinskie Mountains and the Amur River mouth; the Primorskii Krai Province (Primorye territory). North Korea. North, and probably, North-Eastern China.

The subspecies is characterised by an average greater size, the fore wing length being 22–26 mm in males and 22–24 mm in females. The fulvous band on the wing underside is considerably narrower than in the above mentioned subspecies. The ocelli on both sides of the hind wing are roundish and large, their diameter being noticeably larger than half of the distance between the veins. They are blind in males and centred with very small white dots in females. Distinct from the two preceding subspecies the fulvous band on the fore wing upperside, mainly in males, has a strong narrowing between the veins  $M_3$  and CuA, so that the ratio of the width of the band at this point to the fore wing length varies from 0.09 to 0.14 in males and from 0.16 to 0.18 in females.

Note. Describing this taxon Kurentzov (1950) compared it with “*Erebia ligea ajanensis*”. It turned out, however, that he applied the latter name to the butterflies belonging to true *E. ligea* (to its eastern subspecies), while, as we have shown, the type series of the taxon *ajanensis* in fact belongs to the other species. So the differential diagnosis by A. Kurentzov is applicable in general to the species *E. ajanensis* (= *E. ligea arsenjevi* sensu Kurentzov, 1950) as differing from *E. ligea* (= *E. ligea ajanensis* sensu Kurentzov, 1950), but not to distinguish-



Figs 18-24. Male genitalia structure of *Erebia ajanensis* and *Erebia ligea*. 18. *E. ajanensis kosterini* P. Gorbunov, Korshunov et Dubatolov. Holotype of *Erebia kosterini* P. Gorbunov, Korshunov et Dubatolov. 19. *E. ajanensis arsenjevi* Kurentzov. Primor'ye, Dal'negorsk. 20. *E. ligea eumonia* Ménétériès. Buryatia, Northern Transbaikalia, Kichera. 21. *Ditto*. Khabarovskii Krai, Nature Reserve "Komsomol'skii". 22. *E. ligea* ssp. (after Kawazoé and Wakabayashi, 1976: 268). 23. *E. ligea eumonia* Ménétériès (after Kurentzov, 1970: 61, fig. 59-6. *E. ligea ajanensis* sensu Kurentzov). 24. *E. videri* Elwes (after Warren, 1936: pl. 30, fig. 292).



Figs 25–36. Valvae of *Erebia ajanensis* and *Erebia ligea*. 25–30. *E. ajanensis arsenjevi* Kurentzov. Primorye, the Sokolovka River. 31–32. *Ditto*. North Korea, Paekimjun. 33. *E. ligea rishirizana* Matsumura. Hokkaido, Mt Nishikumanoshiri. 34. *E. ligea takanonis* Matsumura. Honshu, Mt Yatsugatake. 35. *E. ligea eumonia* Ménétriès. Lectotype of *Erebia eumonia* Ménétriès. 36. *Ditto*. Paralectotype of *Erebia eumonia* Ménétriès.

ing subspecies *E. ajanensis s. str.* and *E. a. arsenjevi*. Of course, we can only provisionally state that the materials enumerated above belong to a subspecies differing from the nominotypical one, which is known by two females only. However, easily noticeable differences in general size and in relative size of the ocelli on the hind wing, as well as a great distance between the sites, suggest such a conclusion.

### *Erebia ligea* (Linnaeus, 1758)

Range (Fig. 2). Western and Eastern Europe, North-Eastern Kazakhstan, Russia (European part, Siberia, and the Far East, except for the north; Sakhalin), Northern Mongolia, North-Eastern and North China (Kogure and Iwamoto, 1992: 18, pl. 1, fig. 4; 1993: 30), Korea, Japan (Rishiri, Hokkaido, Honshu).

***Erebia ligea eumonia* Ménéttriès, 1859, stat. nov. (Figs 7, 14)**

*Erebia eumonia* Ménéttriès, 1859, *Bull. phys.-mat. Acad. Sci. St. Petersb.* **17**: 216; Ménéttriès, 1859, *In* Schrenck, L. v., *Reisen und Forschungen im Amur-Lande* **2** (1): 34, pl. 3, fig. 4.

*Erebia ajanensis*: Graeser, 1888, *Berl. ent. Z.* **32**: 96 (*nec* Ménéttriès, 1857).

*Erebia ligea ajanensis*: Eiffinger, 1907, *in* Seitz, A. [Ed.], *Groß-Schmett. Erde* **1**: 108, pl. 37, row g; Warren, 1936, *Monograph Genus Erebia*: 51, pl. 58, figs 549, 550, 553–555, genit. pl. 24, fig. 245; Kurentzov, 1950, *Ent. Obozr.* **31**: 243; 1970, *Butterflies Far East USSR*: 62, fig. 60-1; Sedykh, 1979, *Ent. Obozr.* **58**: 294; Kogure and Iwamoto, 1992, *Yadoriga* (150): 17, pl. 1, fig. 6; Korshunov and Gorbunov, 1995, *Butterflies Asian Part Russia*: 122, *nec* Ménéttriès, 1857).

*Erebia ligea koreana* Matsumura, 1928, *Insecta matsum.* **2**: 194, **syn. n.**; Kurentzov, 1970, *Butterflies Far East USSR*: 62; Lee, 1982, *Butterflies Korea*: 80, pl. 52, figs 185A–C; Tuzov, 1993, *Syn. List Butterflies ex-USSR*: 31.

*Erebia ligea koreana*, ab. *hakutozana* Matsumura, 1928, *Insecta matsum.* **2**: 195 [infrasubspecific; unavailable].

*Erebia ligea kamtschadalis* Goltz, 1932, *Dt. ent. Z. Iris* **47**: 114, **syn. n.**; Korshunov and Gorbunov, 1995, *Butterflies Asian Part Russia*: 122.

*Erebia ligea*: Kogure, 1985, *Yadoriga* (122): 5, pl. 1, figs B, C.

*Erebia ligea* ssp.: Kogure and Iwamoto, 1992, *Yadoriga* (150): 18, pl. 1, fig. 3.

Type locality. “Bai Hadschi” [now—Sovetskaya Gavan’, Khabarovskii Krai Province, Russia].

Type materials. Lectotype of *Erebia eumonia* ♂ (Fig. 7) with labels: “Bai Hadschi” (handwriting on red paper); “Schrenk.” (printed on white paper); “coll. Acad./Petrop.” (printed on white paper); “Lectotypus *Erebia/eumonia* Mén./design. Dubatolov 1997” (on red paper); “*Erebia/ligea/eumonia* Mén./V.V. Dubatolov det. VI 1997” Paralectotype. 1 ♂ (Fig. 14) with the same labels, except for “Paralectotypus *Erebia/eumonia* Mén./design. Dubatolov 1997”. 1 ♀ with the same labels, except for “Paralectotypus *Erebia/eumonia* Mén./design. Dubatolov, 1997” (on red paper); “*Erebia/ajanensis* Mén./V.V. Dubatolov det. VI 1997.” All in ZIN. Lectotype of *Erebia ligea koreana* ♂ (Fig. 8) with the labels figured on Fig. 9. It is preserved in the Hokkaido University, Japan.

Additional materials. Amurskaya Province: 6 ♂, western border of the Nature Reserve “Zeiskii”, the Erakingra River, 12–20. VII. 1977 (L. Morozova leg.). Khabarovskii Krai Province: 2 ♂, Okhotsk, 23. VII. 1987 (V. Nebaikin leg.); 1 ♂, the same locality, 8. VIII. 1987 (V. Nebaikin leg.); 10 ♂ 3 ♀, Shantarskie Isl., Bolshoi Shantar Is., 18. VII–8. VIII. 1925 (Dulkeit leg.); 1 ♂, the same locality, 22. VII. 1911 (Soldatov leg.); 1 ♂ 1 ♀, Nikolaevsk-na-Amure (Graeser leg., Erschoff collection); 7 ♂ 3 ♀, the same locality (Graeser leg., coll. Dieckmann); 1 ♀, Sukhanovka (Low Amur), 6. VIII. 1910 (Soldatov leg.); 1 ♂, the Nature Reserve “Komsomol’skii”, 3. VII. 1988 (V. Olschwang leg.). Primorskii Krai Province: 4 ♂, near the settlement Krasnorechenskii, 12–13. VII. 1992 (V. Baglikov leg.). Yakutia: 3 ♂, near Olekminsk, 10. VI–17. VII. 1910 (Kharitonov leg.); 3 ♂, the same locality, Nakhtuiskoe, 5. X (!?). 1916 (Gubelman leg.); 1 ♂, the Nature Reserve “Olekminskii”, the Tuolba River, 1. VI. 1988 (Golyakov leg.); 1 ♂, 273 km from Ust-Maiskii (= Ust-Maya), 26. VII. 1928 (Kyakshto leg.). Magadan Province: 1 ♂, Omulevskie Mts, the Avr rivulet, a left tributary of the Omulevka River, 10. VII. 1974 (V. N. Dubatolov leg.); 1 ♂, 15 km SW of Verkhnyaya Buyunda, 8. VII. 1981 (A. Jakimavičius leg.); 3 ♂, the settlement Palatka, 14. VII. 1993, 16. VII. 1995 (V. Baglikov leg.); 1 ♂, the settlement Ola, 19. VII. 1993 (V. Palekha leg.); 1 ♂, the settlement Karamken, 8. VIII. 1993 (V. Palekha leg.); 1 ♀, a paratype of *E. kosterini* (!), Koni Peninsula, the low reaches of the river Khindzha, 20. VII. 1989 (O. Kosterin leg.). Kamchatka: 1 ♂, a ravine on the western slope of Mt Nachikskaya, 17. VII.

1959 (Kurentzov leg.); 1 ♂, the Nature Reserve "Kronotskii", the caldera of the Uzon volcano, 11. VIII. 1985 (A. Lvovsky leg.); 1 ♀, the same Nature Reserve, Dolina Geizerov [the valley of geysers], 7-13. VIII. 1985 (A. Lvovsky leg.); 4 ♂, a coastal hilly *Empetrum* tundra at the settlement Ozernovskii, 11-12. VIII. 1991 (O. Kosterin leg.); 3 ♂, Bolsheretsk, Apacha, 16. VII. 1983 (V. Olschwang leg.); 1 ♂, Ganaly, 16. VII. 1983 (V. Olschwang leg.); 1 ♀, the same locality, 2. VIII. 1961 (N. Violovich leg.).

Range. Russia: the southern Magadan Province, including the Kolyma River upper flow, Kamchatka, S Yakutia, the Amurskaya Province, the Khabarovskii Krai Province (a coast of the Sea of Okhotsk, the mountains northwards of the Amur River lower flow), Primorskii Krai Province (the Sikhote-Alin' southwards to the settlement Krasnorechenskii), Chitinskaya Province (except for SE), Buryatia, Tuva, Southern Krasnoyarskii Krai Province (the eastern part of the East Sayan), Khakasia, Altai Mts, except for the northern part, NE Kazakhstan (the Altai Mts within the Vostochno-Kazakhstanskaya (East-Kazakhstan) Province). Mongolia: Mongolian Altai, East Sayan, North Hangai, Hentei, recorded for the following aimaks: Bajan-Ölgij, Uvs, Dzavchan, Chövsgöl, Archangaj, Bulgan, Töv, Chentij (Korshunov and Soljanikov, 1976; Korshunov, 1977). Korea: Gaemagoweon Plateau area in Pyeongannamdo, Hamgyeongnamdo, Hamgyeongbudgo Provinces (Lee, 1982) and, probably, others in north part of the country. According to Kogure and Iwamoto (1993), North and North-Eastern China (Hebei, Henan, Shaanxi, Shanxi, Nei Mongol, Jiling, Liaoning, Heilongjiang).

Distinct from dark butterflies of the East European/West Siberian subspecies *E. ligea kamensis* Krulikowsky, 1909 with reddish-brown bands on the wing upperside and much reduced white band on the hind wing underside, which inhabit the southern West Siberia, including the North Altai, Kuznetskoe Upland (including the elevation of Salairskii Kryazh, the elevation of Gornaya Shoria and the Kuznetskoe Alatau Mts) east to the environs of Krasnoyarsk, *E. l. eumonia* is characterised by brownish-yellow bands on the wing upperside and a well developed band on the hind wing underside, composed of white spots (Korshunov and Gorbunov, 1995). In general, butterflies of the latter subspecies are very variable in shape and expression of the fulvous band and ocelli on the wing upperside, as well as of the wing underside pattern. So, the specimens from Kamchatka, described as *E. l. kamtschadalis* Goltz, 1932 are within the range of variation of *E. l. eumonia*.

### *Erebia ligea sachalinensis* Matsumura, 1911

*Erebia ligea*, var. *sachalinensis* Matsumura, 1911, *Thousand Insects Japan* (Addit.) **3**: 525, pl. 37, figs 4-4a.

*Erebia ligea sachalinesis*: Hori and Tamanuki, 1937, *Rep. Saghalien Cent. exp. Stn* **19**: 126, pl. 3, fig. 2; Kurentzov, 1970, *Butterflies Far East USSR*: 62, fig. 60-2; Kogure and Iwamoto, 1992, *Yadoriga* (150): 17, pl. 1, fig. 5.

*Erebia ligea takanonis*: Tuzov, 1993, *Syn. List Butterflies ex-USSR*: 31; Korshunov and Gorbunov, 1995, *Butterflies Asian Part Russia*: 122 (nec Matsumura, 1909).

*Erebia ligea sachalinensis*, ab. *murasei* Matsumura, 1928, *Insecta matsum.* **2**: 195 [infrasubspecific; unavailable].

Type locality. "Saghalien (Motodomari)" [now—most probably, settlement Vostochnyi, Makarovskii district in Sakhalin, Russia].

Type material. Not studied.

Materials. Russia: Sakhalin: 8 ♂ 1 ♀, no more precise locality (Suprunenko leg.); 3 ♂,

Yuzhno-Sakhalinsk vicinity, 20–30. VII. (A. Basarukin leg.).

Range. Russia : Sakhalin.

Butterflies of this subspecies rather resemble the above described subspecies in the wing upperside, the fulvous band being darker, near to the extent observed in *E. ligea kamensis*. The character is well seen from the nice colour photograph in the paper of Kogure and Iwamoto (1992 : pl. 1, fig. 5). The most remarkable difference consists in blue, not white, colour of the pupils in the ocelli, if they are present. This character is shared by subspecies from Sakhalin (ssp. *sachalinensis*), Hokkaido (ssp. *rishirizana*) and Honshu (ssp. *takanonis*).

***Erebia ligea rishirizana* Matsumura, 1928 (Figs 10–11)**

*Erebia ligea rishirizana* Matsumura, 1928, *Insecta matsum.* 2 : 195 ; Kawazoë and Wakabayashi, 1976, *Color. Illust. Butterflies Japan* : 273, pl. 60, fig. 2a–2b ; Kurentzov, 1970, *Butterflies Far East USSR* : 63.

*Erebia ligea daisetsuzana* Kurentzov, 1970, *Butterflies Far East USSR* : 63. **Syn. nov.**

*Erebia ligea rishirizana* ab. *daisetsuzana* Matsumura, 1928, *Insecta matsum.* 2 : 195 [infrasubspecific ; unavailable].

*Erebia ligea takanonis*, ab. *junsaiensis* Matsumura, 1928, *Insecta matsum.* 2 : 194 [infrasubspecific ; unavailable].

Type locality. Oshidomari, Rishiri I., Japan.

Type material. Not studied.

Materials. Japan, Hokkaido : 1 ♂ 1 ♀, Kato-gun, Kamishihoro-cho, Mt Nishikumanoshiri, 28. VII. 1994 (K. Maeda leg.).

Range. Japan : the Rishiri Island, the mountains of the central part of Hokkaido (Fukuda *et al.*, 1984).

This subspecies is similar to the preceding one in the wing upperside, but the fulvous band is much lighter as in *E. ligea eumonia*. The difference also consists in the blue, not white, colour of the pupils in the ocelli.

***Erebia ligea takanonis* Matsumura, 1909 (Figs 12–13)**

*Erebia ligea takanonis* Matsumura, 1909, *Ent. Z.* 23 : 91 ; Warren, 1936, *Monograph Genus Erebia* : 52 ; Kawazoë and Wakabayashi, 1976, *Color. Illust. Butterflies Japan* : 273, pl. 60, figs 2d, 2e, 2f.

*Erebia ligea kisokomana* Murayama, 1964, *Z. wien. ent. Ges.* 49 : 37, pl. 4, figs 10–13 ; Kawazoë and Wakabayashi, 1976, *Color. Illust. Butterflies Japan* : 273, pl. 60, fig. 2c.

Type locality. Honshu (Yatsugatake 7000 Fuss).

Type material. Not studied.

Materials. Japan, Honshu, 1 ♂ 1 ♀, Yamanashi Pref., Kitakoma-gun, Oaza-mura, Mt Yatsugatake, Daimonsawa, 6. VIII. 1979 (M. Hosotani leg.).

Range. Japan : the mountains of the central part of Honshu (Fukuda *et al.*, 1984).

It is characterised by a very wide and light fulvous band on the wing upperside. *E. l. kisokomana* Murayama was described also from Honshu (Kisokomagadake Range in Nagano). It is very similar to *E. l. takanonis*. But, according to the original diagnosis, in this subspecies the fulvous band of the fore wing is even more widened, as compared with

*takanonis*, which leaves a narrower brownish-black outer margin. Based on the illustrations of *E. l. kisokomana* available to us (Murayama, 1964: pl. 5, figs 10–13; Kawazoé and Wakabayashi, 1976: pl. 60, fig. 2c) and *E. l. takanonis* (Kawazoé and Wakabayashi, 1976: pl. 60, fig. 2d) as well as the material studied we consider that the differences between them are within the rank of infrasubspecies variation.

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## 摘 要

東アジアのクモマベニヒカゲ群の再検討 (V. V. Dubatolov, Yu. P. Korshunov, P. Yu. Gorbunov, O. E. Kosterin and A. L. Lvovsky)

東アジアには翅斑の特徴同様の交尾器のよく分化したベニヒカゲ属のふたつの近縁種が分布していることが明らかになった。それらはクモマベニヒカゲ *Erebia ligea* (Linnaeus, 1758) およびもう一つは同所的な種で、後者は古く *Erebia ajanensis* Ménétrières, 1857 の名称をもち、本報では次の3亜種に区分した。

### 1. 原名亜種 *E. ajanensis ajanensis* Ménétrières, 1857

ロシア、ハバロフスク州のオホーツク海沿岸地方に知られる。かつては *E. ligea* の亜種に位置付けられていた。今回、ロシア科学アカデミー動物学研究所(セント・ペテルスブルク)に保管されていた標本を後模式に指定して、標記の名称と均質群の地理的範囲を確定させた。

### 2. 亜種 *E. ajanensis kosterini* P. Gorbunov, Korshunov et Dubatolov, 1995

ロシア、マガダン州南部に分布する。本集団は先に P. Gorbunov 他 (1995) で "*Erebia kosterini*" として新種として発表したものである。

### 3. 亜種 *E. ajanensis arsenjevi* Kurentzov, 1950

ロシア極東地区南部、朝鮮、中国北部および東北部? に知られる。この集団も *E. ligea* の亜種とされ、Kurentzov (1970) では独立種として扱われながらも、名称のつづりが誤っていた。本報でこの名称を担う後模式指定(ロシア科学アカデミー極東支部土壤生物学研究所)をして、地域集団を確定させた。

上記3つの集団に対する名称群は、いずれも今回初めての昇降格、[種との]結合がなされた。また、それらの集団は広義の日本列島(サハリンを含む)の集団とは関連がない。

一方、従来の *E. ligea* についても検討し、本報において *E. ligea koreana* Matsumura, 1928 および *E.*



*eumonia* Ménétriers, 1859 のそれぞれの後模式を指定した。後模式標本の指定後、名称 *eumonia* は *E. ligea* の最も古い東方亜種名として活用できることとなり、北部を除くアルタイ山脈からマガダン州および朝鮮に分布する真のクモマベニヒカゲに適用した。この広大な地域から記載された *E. ligea* と想定される群は、*E. ligea sachalinensis* Matsumura, 1919, *E. ligea rishirizana* Matsumura, 1928 および *E. ligea takanonis* Matsumura, 1909 を除き、すべて *E. ligea eumonia* の異名と考えられる。

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